office. A patient who needs a percutaneous procedure does not have to wait for an intervention because the procedure can be done soon after the detection of pathology. We can salvage most of the accesses before they thrombose by a very active screening program for failing fistulas and arteriovenous grafts.[3,4] We are able to control our schedule. Many more procedures can be done during working hours when the office is open, in contrast to a similar period of time in the hospital operating room.

Procedures that can be done in the office are listed in Table I. Case volume will grow as technology and skills improve, as well as from referring physicians who realize how effectively we can provide the care in the office. In addition, by word of mouth, we are receiving more direct referrals because of patient satisfaction. Postoperative patient calls have shown 98% patient satisfaction.

Safety. Most data available for outpatient endovascular interventions have to do with procedures being done in the hospital and the patient being discharged the same day. Criado et al[5] and Lombardi et al[6] confirmed the safety of these procedures being done in the hospital with the same-day discharge. Lombardi et al also showed significant cost-savings when the procedure was done on an outpatient basis. Now, many procedures are being done in office-based settings.

Patient safety is paramount in any setting and especially in the office setting. In 2008 we presented data at the Midwestern Vascular Surgical Society meeting[7] reporting a complication rate of 2.1% and 0% mortality in 932 procedures. We have now been open for 2 years and there has been no death, dye-related renal failure needing dialysis, or limb loss due to a complication. The change in the setting from the hospital to the office should not change the complication rate inherent in the procedure. Protocols are needed to take care of these complications if they occur in the office.

Increased revenue and decrease in health expenses. Revenue to the practice significantly increases when the procedures are done in the office. Total revenue will depend on the mix of cases. We were able to increase the revenue stream without compromising patient safety. Overhead increases, but the net result is an increase in physician and employee compensation. At the same time, there is a significant savings to Medicare and other payers.

There is minimal preoperative workup. The only laboratory tests done before the angiogram are measurements of serum levels of urea nitrogen and creatinine, PT, and PTT. We do not do any preprocedural workup in patients who are having dialysis-related or venous procedures. Dialysis patients are quite comfortable at their current potassium levels and are able to manage swings in potassium levels very well.

We do all dialysis-related and venous procedures under local anesthesia. Light or moderate conscious sedation is used for peripheral angiography and interventions. There are no costs for an anesthesiologist or for any of the other ancillary services that are provided in the hospital. We have shown that when the procedure is done in the hospital, Medicare pays more for each procedure when payment to the hospital and the professional component are combined (Table III) compared with the total payment for the office-based procedure. This ultimately results in savings to the payers.

CONCLUSIONS

Our office-based access and imaging center has improved our revenue stream, improved quality of care, and improved our time management. We strongly recommend that every vascular surgery practice carefully considers its options and opens an office-based center. Individual surgeons who do not have the resources could partner with others. In summary, an office-based access and imaging center increases revenue for the doctors and their team, decreases health care expenses, and most importantly, improves patient care.

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DISCUSSION

Dr Mark Adelman (*New York, NY*). Certainly, many of us believe that there are many patients and many procedures that are best done in the office setting. The revenue stream that you report in your presentation is quite dramatic. You also presented architects sketches and an elaborate infrastructure that you have grown in that office. You didn't comment much on the expense side of the balance sheet. It seems like a very large undertaking to bring all that clinical space and support into the office setting. I wonder if you could comment on how long it took you to amortize the expenses associated with this office-based practice to the point where you were both offering better case, and demonstrating a profitable business. Could you offer us some details of your business plan?

Dr Krishna Jain. Absolutely. You have to have a business plan, a good business plan, because you need to know your volume

and your case mix before you go to this kind of an endeavor. The one easiest thing to calculate may be our overhead. Our overhead was 60% before we opened this center, and the overhead even after doing this is still 60%. But since our overall revenue has increased significantly, we are able to take more pay home. So it looks daunting, but it is not that difficult. But you need to have a proper business plan depending on your case mix.

Dr Linda Harris (*Buffalo, NY*). What is the cost of maintaining all the equipment that you need in your office, including wires, catheters, and balloons?

With the proposition now that there is going to be bundling of endovascular procedures, have you calculated that into your evaluation of how much financial benefit there is to the practice?

Dr Jain. We are not totally sure of that. And the reason for that is because we have friends in interventional radiology who actually have a much stronger lobbying group than we do and they are always fighting for it.

But coming back to the cost of catheters, et cetera, everything that we have in the office is on consignment. So we don't pay for it until we use it. And you can easily negotiate—you have to be able to negotiate. There are several companies who would like to continue coming to your office.

What is crucial to this is data collection, and that is why we are presenting this here. My hope is that all the centers like us are able to collect data. If we are doing 1000 to 1500 cases in our office, if there are 10 centers like that, if we can every year give to Medicare 15,000 to 20,000 cases, how much money we are saving to Medicare, we may have a better case.

Dr George Meier (*Cincinnati, Ohio*). Krishna, thanks very much for bringing this to us. I think it is important that we get that on the table and that people start discussing the issues, since it is relatively new to many vascular surgeons, yet for many interventional nephrologists this is old hat. I think that one of the challenges that we are going to have is how we prove the quality of what we are doing. I would like your insight into that, because clearly quality is going to be an important component of these interventions over time. How are we going to maintain quality with multiple centers performing these procedures across multiple specialties? Thanks for bringing this to us.

Dr Jain. That is absolutely right. That is one of our concerns and that is the reason we are collecting data and publishing it. What I would suggest is—because the biggest number of cases, at least the dialysis, are being done by interventional nephrologists with very little oversight, and now there is this society, another society like the Society of Clinical Vascular Surgery—to get together and have a position paper and have some guidelines, what are the requirements. We have created an operating room environment basically in our office, and every one of us, including our nurses, are all ACLS [advance cardiac life support] certified. So we are very quality conscious, but right now there is really no way to measure how we can make sure that it is being done. And if we don't do it, the government will make us do it. So I think we should work together to make sure that we have the data and publish that data for quality control.

Dr Peter Lawrence (*Los Angeles, Calif*). We have built a similar center at UCLA [University of California, Los Angeles] and have run into one problem, and I'd be interested in your advice. We are represented by a university that negotiates the contracts. We do well with Medicare, but when we get into contracts with other health plans, some of them have only been paying us the pro fee rather than the global for ambulatory cases. We may use $1000 worth of devices or catheters and can't get that reimbursed. I am curious as to whether you have run into this with contracts with other health plans, how you force them to pay the global rate in the office rather than paying the pro fee alone, which ends up with a net loss if you can't get the global revenue.

Dr Jain. You are absolutely right, and that is sometimes a problem. We have not faced that problem. Kalamazoo is a smaller town and we have a relationship with the insurance companies.

But the data like what we are presenting, if we take it to them, that if we do it in the office you are going to save $3000, it would be easier to convince them that this is the right thing to do. It may take some time, and I would urge a center like yours and others to get together and pool your data and show how you can save them the money. And everybody is looking. The government wants to cut $2 trillion, and we can show them in a very minute scale how we can save some money.

Dr Robert Zwolak (*Lebanon, NH*). This is an important paper that leads me to make one point and ask one question. The observation is that we need to be careful about reimbursement recommendations because in 2011 there is likely to be a new coding scheme for percutaneous intervention with new reimbursements. SVS [Society for Vascular Surgery] is working with cardiologists and the radiologists to make the new system as reasonable as possible.

My question has to do with training. It is a reality that many vascular practices are shifting substantially to office-based procedures. You demonstrated a net reduction in expense to the government for providing these procedures, and I suspect that will fuel a continued migration from hospital to office. In your practice, do you or your partners operate exclusively in the hospital or the office? What do you see happening to surgeons as we go forward? Will there be two types of vascular surgeon, the office-based surgeon and the hospital-based surgeon? Should we consider separate office-based vs hospital-based training paradigms?

Dr Jain. I don't think so. Because what we are doing in the office basically is the same thing we are doing in the hospital. It is the same skill set that we use in the hospital, in the endovascular suite, or radiology practice. It is the one we are bringing to the office because people like me, who are older, are learning from my younger partners. So what they are doing in the hospital, similar procedures we are doing in the office. We have not reached a point where the radiology is doing only the venous practice. Some practices do that, but the way we are set up, all guys do all the things. So some of that may occur, but I think it will take time.